

# Saving Natural Teeth: Intentional Replantation—Protocol and Case Series

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## Abstract

**Introduction:** Intentional replantation is a reliable and predictable treatment for cases in which nonsurgical endodontic retreatment failed or is impractical and endodontic surgery is hampered because of anatomic limitations. **Methods and Results:** This article presents a protocol for intentional replantation illustrated with some interesting cases. The cases presented here are from patients (average age, 61 years) with no contributing medical history. The cases are molars with previous failed endodontic treatment/retreatment and diagnosed with apical periodontitis. Treatment procedures included atraumatic extractions with minimal manipulations of the periodontal ligament, followed by root-end resection, root-end preparation with ultrasonic tips, root-end fill with bioceramic cement, and rapid tooth replacement into the socket. Granulomatous tissue was gently curetted when applicable. All procedures were performed under the microscope. **Conclusions:** Intentional replantation with careful case selection may be considered as a last option for preserving hopeless teeth. Atraumatic extraction by using state-of-the-art equipment, instruments, and materials, minimal extra-alveolar time, and maintaining an aseptic technique are key factors for success. (*J Endod* 2017; ■:1–6)

## Key Words

Apical surgery, endodontic treatment, intentional replantation

Intentional replantation of a tooth involves removing the tooth and reinserting it into the socket after endodontic manipulation, obturation of the canal/root-end filling, or both (1).

Although nonsurgical endodontic therapy has been shown to have an excellent survival rate (2), this initial procedure can occasionally fail to address the entire source of infection, resulting in persistence of periapical symptoms. Another treatment option is endodontic surgery. The objective of apical surgery is to surgically maintain a tooth that primarily has an endodontic lesion that cannot be resolved by nonsurgical endodontic (re)treatment (3). It has been reported in the literature that high success rates of 94% can be obtained by using modern apical microsurgery (4). However, apical surgery may be considered an unfavorable procedure when anatomic factors may interfere with surgery outcome (eg, buccal plate thickness, proximity to anatomic structures such as the mandibular nerve, or inoperable sites such as lingual surfaces of mandibular molars) (1, 5).

Intentional replantation is indicated when a previous endodontic treatment failed and because an orthograde endodontic retreatment or apical surgery is impractical (5). Another important factor to take into consideration is when financial factors preclude conventional implant placement (6, 7), and intentional replantation may be considered a unique chance for preserving a natural tooth.

The main advantage of intentional replantation technique is that tooth surfaces, including inaccessible areas, can be visualized and instrumented completely without damaging adjacent periodontal tissues, contributing to reestablishment of healthy periradicular tissues. The contraindications to intentional replantation are periodontal involvement with extensive mobility of the tooth, destroyed or missing labial or buccal plate, or septal bone at the bifurcation (1, 5–7).

Intentional replantation is not a frequently used treatment technique in private offices because of the wide variance in reported success rates (1, 7, 8) and the absence of an established protocol (9, 10). However, a recent systematic review and meta-analysis revealed a weighted mean survival of 88% (95% confidence interval, 81%–94%) for intentional replanted teeth (9).

The purpose of this article is to share a protocol used for intentional replantation in our institution as well as cases where clinical and radiographic exams showed characteristics of a good outcome.

## Methods

The cases presented here are from patients (average age, 61 years) with no contributing medical history who were referred to the Department of Endodontics at School of Dentistry, University of Texas Health Science Center at Houston (UTSD).

## Significance

This article presents a protocol for intentional replantation for cases in which conventional endodontic retreatment failed or is impractical and endodontic surgery is hampered because of anatomic limitations.

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## Case Report/Clinical Techniques

All cases were performed by endodontic residents under faculty supervision. The cases were molars with previous failed endodontic treatment/retreatment and diagnosed with apical periodontitis. After proper medical and dental history review, clinical exam comprised inspection of the entire mouth (teeth, tongue, gingiva, and mucosa), thermal tests, percussion, palpation, and probing depths. Radiographic exam consisted of conventional radiographs and cone-beam computed tomography (CBCT).

After diagnosis, treatment plan, and all consents were signed, treatment procedures included atraumatic extractions as possible (minimal damage to the surrounding tissues and bone by using deep gripping forceps) under local anesthesia, minimal manipulations of the periodontal ligament, followed by root-end resection, root-end preparation with ultrasonic tips, root-end fill with bioceramic cement, and rapid tooth replacement into the socket. All procedures were performed under the microscope. Granulomatous tissue, when present, was gently curetted and socket irrigated with sterile saline solution. All tissues were submitted to microscopic analysis. Occlusion adjustments were performed when necessary. All cases were followed up clinically and radiographically for at least 24 months (Fig. 1). All cases were

functional and asymptomatic. Figure 2 describes the protocol adopted for all cases described here.

## Case Reports

### Case 1

A 64-year-old woman presented to the endodontic clinic (UTSD) for evaluation of tooth #31 (Fig. 3). Her chief complaint was “discomfort and a strange tissue formation in the lower right area.” Her medical history was unremarkable. Dental history included previous endodontic treatment in tooth #31 completed 3 years prior. Clinical examination revealed a sinus tract in the buccal area of tooth #31, no pain on palpation, but slight discomfort to percussion. Radiographic examination revealed a previously treated root canal, bone loss pattern in mesial and distal areas, radiolucency compatible with apical periodontitis, and a separated instrument in the mesial root. Pulp diagnosis was determined to be previously endodontically treated and periapical diagnosis as chronic apical abscess.

The patient was presented with different treatment options including endodontic retreatment, apical surgery, and intentional



**Figure 1.** Protocol used for all cases described in this article. After atraumatic extraction procedure, the tooth is immediately placed in Hank's balanced salt solution (A and B); root and remaining periodontal ligament should not be touched. Root inspection and dye staining of the tooth (C); tooth held (crown only) with a wet gauze (Hank's balance salt solution). All granulomatous/inflammatory tissue should be removed from the roots and submitted to microscopic analysis (D); root-end resection (E); root-end preparation performed with ultrasonic tips and constant irrigation with saline solution (F and G). All procedures were performed under dental operating microscope visualization (H). Root-end filling material is disposed and condensed into prepared tooth (I–K); tooth is replanted into the socket (L).

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